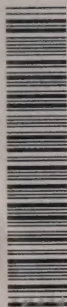


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ENERGY SECURITY FOR CANADA

EXPANDING ENERGY SUPPLIES



Ministry
of
Energy

Honourable
Vincent G. Kerrio
Minister



**A MESSAGE FROM
THE HONOURABLE VINCENT G. KERRIO
ONTARIO MINISTER OF ENERGY**

The Ministry of Energy has prepared this discussion paper on the theme of energy security for Canada specifically for the federal/provincial energy ministers' meeting in Ottawa on January 30, 1987. It is intended to provide a basis for discussion at the conference, and to serve as a source of information on current energy issues in Canada.

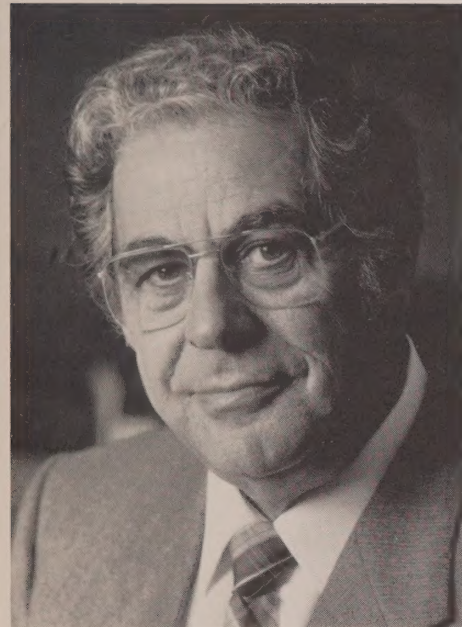
Because energy is so important to our province, the Government and people of Ontario are committed to playing a constructive leadership role in energy matters in Canada.

Our goal is to co-operate with other provinces and the federal government, as well as private interests - to work toward solutions that will benefit all Canadians, by ensuring a more secure and efficient energy future.



**Honourable Vincent G. Kerrio
Minister of Energy**

January 1987





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EXPANDING ENERGY SUPPLIES

1. INTRODUCTION

This paper addresses one aspect of Canada's policy for managing the realities of its energy situation. It focuses on the question of securing future supplies of energy, particularly crude oil and natural gas, and proposes a framework for ensuring a domestic supply capability.

2. THE IMPORTANCE OF MAINTAINING SUPPLY CAPABILITIES

Canada possesses the basic ingredients for securing its energy future.

It has a large and diversified base of energy resources, including crude oil, natural gas, hydroelectric sites, coal and uranium. Equally important is the fact that nature has endowed every region with at least one of these valuable resources.

Canada has the expertise, the technology and the infrastructure to produce, distribute and utilize these resources for the benefit of Canadians. Many individuals enjoy economic benefits from the jobs and incomes generated in various parts of the energy industry.

As a nation, Canada has a well-established political norm for balancing the energy needs of its citizens against the need for income from the export of energy materials. The aim has been — and should continue to be — to ensure that there is a capability to meet foreseeable domestic needs for energy. This norm is widely accepted by Canadians as a valid basis for export policy.

While the basic ingredients do exist to secure Canada's energy future, the realities of international and domestic energy markets should not be ignored. What are these realities?

First, with regard to crude oil, Canada is a price-taker whose income from existing areas of production is constrained by the international price, and whose ability to develop new sources depends on future world prices. The cost of production in countries which have most of the known oil reserves is considerably less than Canadian costs. Consequently, in an era of unstable prices, Canada must decide how it will balance the need for an indigenous oil supply capability against the possible economic penalties of large investments in new supplies.

Second, Canada has ample supplies of natural gas to meet domestic needs until the late 1990s, taking into account current export authorizations. However, total supplies are small in relation to requirements in the combined Canadian and United States market. If Canada's export policy were to be relaxed significantly, it would undermine future supply security, particularly as U.S. supplies tighten.

Third, the pursuit of a secure energy future for Canada is not just a matter of supply development. Equally important is the efficiency with which energy is used, since this reduces the demand for energy and extends the life of reserves.

And fourth, the need for energy in many applications, such as home heating and industrial process heating can be met from the use of many different fuels. Providing consumers with greater choice in the market-place increases their ability to withstand unforeseen and unfavourable developments affecting specific fuels. Greater fuel choice

Crude Oil Supply and Demand, 1980-85

Total Crude Oil and Equivalent

(Thousands of barrels per day)

Year	Production	Consumption	Net Export
1980	1,539	1,878	- 339
1981	1,385	1,746	- 361
1982	1,369	1,490	- 121
1983	1,447	1,420	+ 27
1984	1,532	1,417	+ 115
1985	1,570	1,378	+ 192
1986	1,561	1,351	+ 210

Light and Medium Crude

(Thousands of barrels per day)

Year	Production	Consumption	Net Export
1980	1,328	1,681	- 353
1981	1,186	1,535	- 349
1982	1,169	1,356	- 187
1983	1,218	1,304	- 86
1984	1,266	1,297	- 32
1985	1,286	1,297	- 12
1986	1,290	1,252	+ 38

Sources: Based on data from the National Energy Board and Energy, Mines and Resources Canada.

enhances the security of Canadians' energy future.

Against this backdrop, the next section reviews Canada's recent supply and demand picture and prospects for the future. It identifies the principal areas for the policies which are proposed in the final section.

3. CANADA'S ENERGY SUPPLY/DEMAND PICTURE

Crude Oil

Light crude oil is the only energy form in which Canada does not have surplus capacity.

Since 1983, Canada has been exporting more crude oil than it imports. This is due almost entirely to lower oil consumption, as a result of successful conservation and substitution. Canadian oil consumption fell by 28 per cent between 1980 and 1985.

However, Canada does not have a surplus of light crude oil — the grades required by most Canadian refineries, representing 84 per cent of domestic crude consumption. It is only the trade in heavy crude oil which makes Canada a large net exporter overall. Canadian refineries are not equipped to utilize all the heavy crude produced domestically.

Substantial volumes of low-cost light crude oil are currently being exported: over 250,000 barrels a day in 1986. These exports provide essential cash flow for oil producers, but they also contribute to reserve depletion. Since 1985, light crude exports contracted for less than one year have not been regulated.

Light crude imports serve the Atlantic provinces and part of

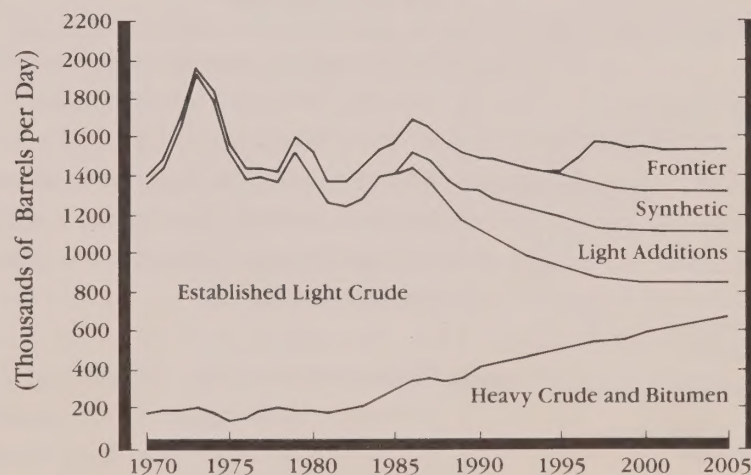
the Quebec market. In a supply crisis domestic light crude cannot be readily re-allocated from western Canada to the Atlantic market.

The outlook is for continuing heavy oil surpluses, but increasing dependence on light crude imports or high-cost domestic sources.

The recent National Energy Board (NEB) staff report, "Canadian Energy Supply and Demand 1985-2005", forecasts that domestic heavy oil supply will be well in excess of domestic requirements up to 2005. Domestic requirements of light crude, however, are forecast to exceed domestic supply by over 350,000 barrels per day by the year 2000.

Additional light crude supplies could come from three alternative domestic sources: upgrading of heavy crude, production of synthetic light crude from bitumen, and supply from frontier areas (such as the East Coast Offshore, Beaufort Sea, Mackenzie Delta, and the Arctic Islands). The Board's forecast includes some supplies from the frontiers

Supply of Domestic Crude Oil and Equivalent

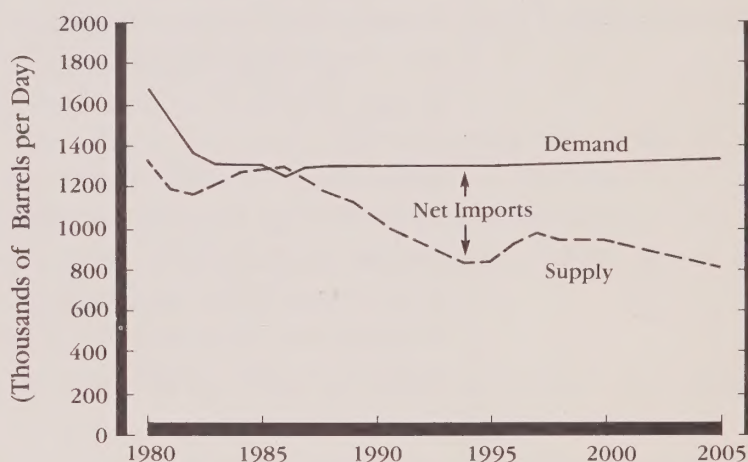


Source: National Energy Board

and from upgraders, starting in the mid-1990s. However, there is much uncertainty in this outlook.

As a result, imports of light crude could reach 30 per cent of domestic demand by the year 2000. Canada could then be vulnerable to both physical supply disruptions and the inflationary effects of sudden price increases.

Light Crude Oil Supply and Demand



Source: National Energy Board

Domestic alternatives to conventional light crude production are all expensive.

Social supply costs for non-conventional and frontier sources, including transportation to market, are estimated to be in the range of \$17 - \$33 U.S. per barrel. The costs are lower for new supplies from the conventional producing areas of western Canada. In a global context, Canadian supplies from new sources are generally very expensive to bring to market.

Higher costs are due to the greater complexity of extraction processes, large capital costs, hostile environments in the Arctic and offshore, and long distances to markets.

Costs of New Oil Supplies¹

Source	Cost (\$U.S. per barrel)
Western Canadian conventional crude	14 - 18
East Coast Offshore (Hibernia)	18 - 22
Beaufort Sea	19 - 26
Synthetic Crude — Mining plant	23 - 33
In-Situ Bitumen plus upgrading	17 - 28

¹Social supply costs including transportation to market, in 1986 dollars.

Source: National Energy Board

These cost estimates could turn out to be high. Improvements in technology, more efficient methods of production, and cost-cutting in response to lower prices could bring down these supply costs. In Alberta, for example, conventional drilling costs were cut by 20 per cent between 1980 and 1985. Costs tend to be bid up when oil prices are high and to decline when prices fall.

Megaprojects could add substantially to Canada's supply of light crude oil.

A single frontier megaproject, such as Hibernia in the East Coast Offshore, or the Amauligak field in the Beaufort Sea, could add about 200,000 barrels per day for a twenty-year period.

Very large supplies could be obtained by extracting bitumen from oil sands and upgrading it to produce synthetic light oil. The proposed new Syncrude expansion would raise productive capacity by about 60,000 barrels per day.

The bi-provincial heavy oil upgrader proposed by Husky Oil would produce 46,000 barrels of light crude per day.

Natural Gas

The future supply and demand picture for natural gas is less promising than was previously projected.

The National Energy Board has revised downward its estimate of natural gas supply from western Canada. The Board projects that productive capacity of natural gas from conventional areas will fall by 30 to 40 per cent by the year 2000. At the same time Canadian demand is expected to rise by some 25 to 35 per cent. As a result, demand will catch up with productive capacity within the next sixteen years.

Costs of New Gas Supplies¹

Source	Cost (\$C. per Mcf)
Additions to existing reserves, western Canada	1.63 – 2.06
New discoveries, western Canada	2.64 – 3.27

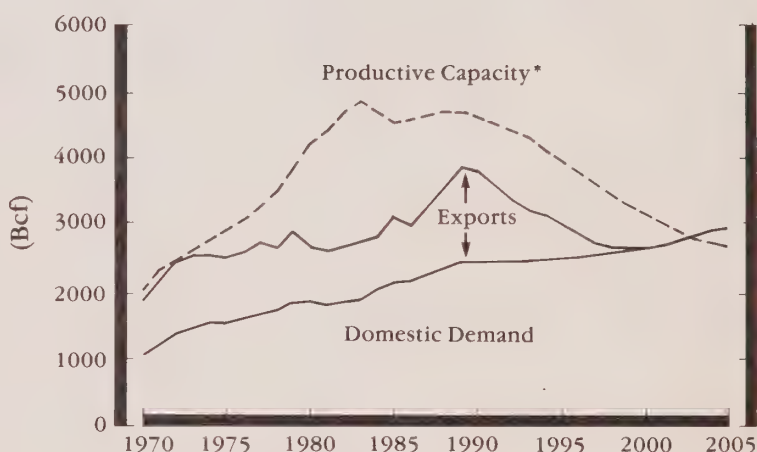
¹Social supply costs at field gate in 1986 dollars.

Source: National Energy Board

The Board expects natural gas exports to double in the near term, but does not think that the export levels authorized to date would actually be achieved. If existing export authorizations were to be evergreened or new licences granted, supplies from the frontiers would be needed to supplement those from conventional areas.

Canada faces rising costs for new supplies of natural gas. New discoveries in western Canada are more expensive than additions to existing reserves. Costs for frontier sources are even higher, considering the expensive transportation infrastructure that is required.

Natural Gas Supply and Demand, Conventional Areas



*Productive capacity includes carry-forward of unused capacity from previous years.

Source: National Energy Board

The supply system for gas is much less flexible than that for oil. Natural gas users depend on fixed pipelines, and imports are not a viable option except for small quantities. Any shortfall in domestic supply would require new higher-cost supplies.

Surplus of Installed Generating Capacity, 1985

	Installed Capacity (MW)	Net Surplus* (MW)
Newfoundland	2,056	144
P.E.I.	124	20
Nova Scotia	2,250	1,148
New Brunswick	3,032	1,061
Quebec	32,108	3,853
Ontario	29,395	3,821
Manitoba	3,948	592
Saskatchewan	2,655	80
Alberta	6,623	0
British Columbia	12,533	4,512
Canada	95,022	13,303

* Reserve Margin less Capacity Reserve Requirements.

Source: Energy, Mines and Resources Canada

Electricity

Canada is currently a net exporter of electricity.

Utilities will continue to be able to provide Canadians with reliable supplies of electricity. Substantial hydroelectric resources remain undeveloped, and there are adequate supplies of coal and uranium. Also, the potential for strategic conservation of electricity is as yet untapped.

Most Canadian utilities have had considerable surplus capacity since load growth slowed in the 1970s. In 1985, all provinces with the exception of Newfoundland, Saskatchewan and Alberta had a net surplus capacity of over 10 per cent. The surplus is gradually shrinking in many provinces because of sharp curtailments in commitments to new capacity. Also, the surplus capacity in some cases includes plants which are uneconomic to operate.

Provincial electric utilities in Quebec, Manitoba, and British Columbia have proposed or begun building capacity for export. The first licence for such export was granted to Manitoba in 1986. Previously, most exports were due to surpluses which resulted when anticipated loads did not materialize or when capacity additions were larger than the short-term increase in demand.

In the past, NEB regulations have required that electricity surpluses be offered to neighbouring Canadian utilities before they are offered to utilities in the United States.

Ontario would like to see this practice continue.

Authorization of electricity exports should take into account future Canadian needs. It is important that resources be available to Canadians first and that Canadians do not pay more for them than foreign buyers.

Inter-provincial electricity linkages are weak.

Improvements would enhance supply security, and could offer savings in energy costs.

Inter-provincial co-operation in exchanging power has lagged behind interconnections to export to the U.S. Apart from the Newfoundland/Quebec interconnection, the total capability of interconnections among the provinces is 4500 MW. By contrast, the total capability of interconnections for export is approximately 13,000 MW.

The future may bring some excellent opportunities for increased trade in electricity within Canada. Some provinces are expected to expand their hydroelectric resources while others will be looking to a range of demand and supply options to meet their future electricity needs.

Some utilities may well find that Canadian electricity markets are more attractive than the highly competitive export markets.

Coal

Canada has an abundance of coal resources.

More than 95 per cent of the coal reserves are in British Columbia, Alberta and Saskatchewan. The rest are in the Maritimes. The domestic demand for coal is mainly for generating electricity, with Ontario and Alberta being the major users. Coal is also required for use in certain industrial applications, notably the production of iron and steel.

The major limitations on the use of coal are the environmental impacts. Also, high transportation costs limit the use of coal from western Canada in central Canada. However, with clean coal technologies emerging, it is possible that Canada's coal reserves would prove a valuable option for meeting future energy needs.

4. FRAMEWORK FOR SECURING FUTURE SUPPLIES

Energy security is not simply a matter of increasing domestic supplies. Security can be enhanced by a wide range of measures, which have been recognized in Canada's energy policies for many years. These include conservation and efficient energy use, substitution of more plentiful energy forms, development of renewable sources, contingency planning arrangements for the possibility of an international oil supply shortfall, and export policies to ensure that reserves are sufficient for Canadian needs. All these approaches should continue to be part of Canadian policy for securing future supplies.

In light of the current situation, policies for securing future energy supplies for Canada should be guided by three major principles.

- (1) **Reducing the need for future supplies should be the highest priority.**

Canada is one of the least efficient users of energy in the world. Despite recent improvements, there remains a great potential for further improvement. By investing in more efficient energy use now, we can make permanent reductions

in our future needs for energy supplies.

Therefore, Governments should make a strong commitment to increased efficiency of energy use. This commitment should include at least:

- o substantial funding for research and development related to energy-efficient technologies;
- o strong programs for information and awareness directed to energy users; and,
- o mandatory standards for energy efficiency where necessary.

Ontario's views on such a policy for energy efficiency are explained in a companion paper.

(2) New energy supplies should be developed for both energy security and regional development objectives.

Canada's energy resources are widely dispersed throughout the nation. Crude oil and natural gas reserves are found in western Canada, the East Coast offshore, and the Northwest Territories. Major hydroelectric resources are present in Labrador, northern Quebec, Manitoba and British Columbia. Coal is an important resource in both the East and the West, and uranium is found in Ontario, Saskatchewan and the Northwest Territories.

Development of these supplies can significantly contribute to regional development objectives, providing jobs and investment for Canadians in regions where economic opportunities are otherwise limited.

In some cases it may be difficult to justify new developments on energy economics alone. But when the

contribution to future energy security is added to the regional development benefits, it can be beneficial to go ahead with new projects sooner than strictly market forces might justify.

In particular, new crude oil supply developments offer a contribution to future energy security, both on a national and regional basis.

Based on present forecasts, Canada could be dependent on imports for a large proportion of its crude oil supplies before the end of the century. The gap between domestic supply and demand could exceed 500,000 barrels a day for light crude oil by 1995. Although foreign crude oil may have lower production costs, the price and availability are less certain than for domestic supplies. Energy security can be enhanced by narrowing the gap that would have to be met by imports.

In assessing new oil supply developments, Canadians should recognize that the national economy would not be strengthened by excessive reliance on high-cost domestic oil supplies. Moreover, fiscal realities dictate that continued large-scale subsidies may not be available.

Policy should aim to reduce the risks inherent in uncertain future world oil prices, risks that may prevent the development of otherwise economic oil reserves. This risk is present in the case of very large, capital-intensive projects with long lead times, such as Beaufort Sea, East Coast offshore or oil sands developments.

The challenge of choosing which projects should proceed and the form of encouragement has been a difficult one. The governments of Canada, the provinces, and territories should work together to develop appropriate methods of encouragement.

Several possible approaches have been proposed to assist in the development of new oil supplies. They include loan guarantees, price guarantees and floor prices.

- o Loan guarantees have been discussed for the Hibernia project and offered for the bi-provincial heavy oil upgrader. These provide a method of partially underwriting the risks of such projects.
- o Price guarantees for a limited quantity of new light oil supplies have been advocated by Husky Oil. An attractive feature of this proposal is that project sponsors would bid a price-guarantee level sufficient for their project to proceed, and the government of Canada could select projects from among those bid.
- o Floor prices are another method proposed in some quarters. However, the concept needs to be carefully examined to determine its possible consequences for both producers and consumers.

The supply contribution of light crude oil and natural gas from existing producing areas should be maximized.

Although production from these areas is forecast to decline, its extent is by no means certain. Production could be enhanced by improved finding rates, technology improvements in exploration and better extraction methods.

Taxation and royalty structures should ensure that the return to oil and natural gas producers provides an adequate incentive for exploration and development of new production. The governments of Canada and the producing provinces have made significant reductions in taxes and royalties in the last two years for just this reason.

(3) The economic benefits of energy exports must be weighed against the effects on Canada's energy security.

There are important economic benefits to be gained from energy exports.

- o Building supply capacity and transportation systems in advance of domestic needs in order to serve export markets have allowed Canadians to develop supplies that might otherwise be unavailable for domestic markets.
- o Exports of crude oil and natural gas provide cash flow for producers as well as employment in producing areas.
- o Exports of surplus electricity have allowed several utilities to provide lower rates to domestic customers.

However, preserving a sufficient supply for Canadian needs has long been a mainstay of national energy policy. This is recognized in the National Energy Board Act and in many years of export regulation.

Moreover, public policy and public investment contributed to the development of substantial parts of Canada's energy supply systems, to link domestic energy supplies with domestic customers. Examples include the National Oil Policy, the TransCanada Pipeline system and the TransQuebec and Maritime system for natural gas.

Canada should not export today if it means less energy security tomorrow.

The regulation of energy exports should have as its objective the achievement of a balance between the economic benefits of exports and the preservation of energy security. Specifically this balance should be sought with respect to the energy resource on which Canadians are relying to a growing extent — natural gas.

Recently, it has been suggested that the future needs of Canadians should only be protected to the extent that natural gas requirements are reflected in natural gas supply contracts.

Such an approach to natural gas exports is unacceptable to Ontario. It would overturn established approaches to export regulation and could jeopardize future supplies to Canadians.

- o Commercial contractual commitments, with their emphasis on short-term competitive pricing, cannot be relied upon to provide security of supply in the long term. Such protection can only be provided by national regulation.
- o Natural gas customers in Ontario and Quebec rely on transmission systems that were built to link Canadian supplies to Canadian customers. Alternative supplies from imports are limited or non-existent.
- o U.S. natural gas demand is expected to revive from current depressed levels and could lead to substantial new demand for Canadian exports. If unchecked, this external demand could rapidly deplete our resources and threaten our security.
- o Even without any new export authorization, Canadian natural gas supplies are forecast to become insufficient to meet domestic needs by the end of the century.

Ontario relies on the National Energy Board to be independent and to protect the reasonably foreseeable requirements of Canadians — whether or not those requirements are reflected in current contracts. That has been the National Energy Board's approach to this matter in the past, and it should remain so.



Ministry of Energy Honourable
 Vincent G. Kerrio
 Minister